Roles of IT in Improving Our Educational System. Part 3. More About Compelling Applications


In last month’s article (Moursund, 2000a), I used spreadsheet and desktop publishing software to illustrate the idea of compelling applications of microcomputers in education. You’ll recall that a compelling application has the following characteristics:

1. It is intrinsically motivating, and it empowers the user.
2. It is a cost-effective aid to solving certain problems and/or accomplishing certain tasks.
3. It is time- and effort-effective. It embodies knowledge and skills in a manner that helps the user to gain a significant level of functionality in solving certain problems and/or accomplishing certain tasks relatively quickly.

Some More Compelling Applications

It is fun to talk to computer-using educators about some of their favorite and most compelling applications. The following are a few examples of typical candidates. (Find more examples online at www.iste.org/L&L/archive/vol27/no3/index.html.)

Electronic Gradebook. “It doesn’t seem to save me much time. But, it allows me to provide better quality feedback to my students about how they are doing and what they need to do. It helps me to quickly answer questions from parents and from the school counselor.”

Desktop Presentation. “I use it all the time. It has replaced my collection of acetate overheads. I can quickly up-date my presentations, I can easily make handouts for students, and it costs nothing to provide copies to my colleagues.”

Spelling and Grammar Checker. “It used to be that when I graded student writing, most of my efforts went into marking spelling errors and rather routine grammar errors. Now I have all of my students using word processors that have spelling checkers and relatively good grammar checkers. If a paper contains the types of spelling and grammar errors the software detects, I merely return it to the student to be redone. I spend much more of my paper-grading time focusing on the higher-order thinking and expression of ideas.”

I am sure that you will have no trouble adding to the list. Roughly speaking, the types of examples teachers provide fall into a few categories:

• Applications that help the teacher do work related to preparing and presenting instruction and handling the grading and reporting aspects of being a teacher.
• Applications that are integral components of students’ required coursework. This includes the full range of software in an integrated application package and multimedia software.
• Applications that fall into the general category of computer-assisted learning (drill and practice, tutorials, and simulations) and distance learning.
• Applications based on use of the Internet to retrieve information and to communicate.
• Adaptive technologies to help students with various types of physical disabilities.
• Edutainment.

Some of the compelling applications are of particular interest to teachers, some to students, and some to both. The remainder of this article presents a distinctly different type of computer application in education. Most educators I talk to find this example particularly compelling.

An Application of Brain Theory

In the past couple of years, many popular press articles have discussed progress in brain theory. The Association for Supervision and Curriculum Development (ASCD, www.ascd.org) devoted most of its November 1998 issue of Educational Leadership to this topic.

Brain theory research relies heavily on information technology (IT). Computerized instrumentation has been developed that can track neural activity in various parts of a person’s brain as the person receives input from the five senses and works to solve problems and accomplish tasks. Here is a scenario of a significant educational breakthrough that has occurred as a result of this type of research. It is based on information found at www.scilearn.com.

Toni’s Scenario

Toni was four years old. She had been diagnosed as severely speech delayed due to hearing impairments. Toni had a neurological problem in which her brain was not able to process the sounds of phonemes at the speed in which they are delivered in human speech. It wasn’t that Toni could not hear—it was that her brain could not adequately process the sounds it received. The incoming phonemes of speech just sort of piled up in her brain, making a jumbled mess that her brain could not decipher.

At best, Toni faced a minimum of four years of intense one-on-one intervention by a highly trained speech therapist. Even with such an intensive educational intervention, the results would be problematic.

However, recent brain research has led to the development of an IT-based intervention that provides a much quicker solution to this educational problem. A four-week intervention developed by cognitive neuroscientists at Scientific Learning was used to train Toni’s brain to process the phonemes of speech at the speed that most people achieve through “normal” brain development. (In essence, Toni spent some time each day playing a highly motivational computer game designed to help her brain learn to process phonemes faster.) With the IT solution provided, Toni’s hearing and speech problems were overcome at a cost of about $800.

How is this possible? Toni could hear phonemes, as long as an individual phoneme was presented approximately 20 to 30 times slower than it is in average speech. Fast ForWord® uses words made up of very slow and long, drawn-out phonemes, and the response is to press an appropriate key. The game is designed to be attention grabbing and highly motivational. Toni could succeed at this game. Over time, the length of the phonemes presented was slowly decreased. Over a period of a month, Toni’s brain adjusted to these shorter phonemes. (Remember, the young brain has extreme plasticity.) In essence, Toni’s brain was re-wired through use of edutainment drill-and-practice software!

In the first article in this series (Moursund, 2000b), I talked about Benjamin Bloom and the “2-sigma” gain in learning that can be achieved through individual and small-group tutoring (Bloom, 1984). It is not clear what value to assign to “N” in order to make a statement that Toni
and others like her make an “N-sigma” learning gain in the processing of speech. Certainly “N” is a lot larger than 2.

Perhaps you have read about similar IT-based aids to help children with certain types of dyslexia. It may well be that 2% or so of all children have the types of neurological problems that are easily addressed by these IT-based interventions. Roughly speaking, this means that in the United States, approximately 100,000 children are born each year who could substantially benefit by these breakthroughs in brain research.

Editor’s note: This type of compelling application fits well into the up-coming L&L theme issue on Student-Centered Use of Highly Interactive Computer Software. Read more in the editorial calendar at www.iste.org/L&L under About L&L.

In Summary

Most computer-using educators have no trouble identifying a number of computer applications that they and/or their students find compelling. There is significant research supporting the educational value of some of these compelling applications. For others, the decision to use the application is made independently of any supportive research. Remember, compelling is in the eyes of the person being compelled. A student may find an edutainment game compelling because of its entertainment value, even though it happens to have some educational value from the point of view of a teacher.

The compelling application of IT combined with brain theory brings a new dimension to education. It is one of the most compelling applications of IT in education that I have ever seen. It is suggestive that for certain students we can do a really lot better than we are currently doing.

In subsequent articles, I will continue to explore roles of IT in the Science of Teaching and Learning (SoTL). I am particularly interested in use of IT to make education a really lot better for the great majority of students.

Resource

Fast ForWord is available from Scientific Learning, 1995 University Ave., Suite 400, Berkeley, CA 94704; 888.665.9707; fax: 510.665.1717; info@scilearn.com; www.scilearn.com.

References


